

means we annihilate distance and draw the Empire together. By these means we enable them to conquer the wilderness and still carry with them the necessities of civilisation. By these means, in the tiniest hamlet, we plant almost first the schoolhouse to which the children go, and, when the principle of a scientific system of education is really in practice, the Empire will be marching indeed. Therefore I hail to-night, sir, the presence here of the intellectual men who are representatives of the scientific movement, and their blending with the British Empire League I take as one of the happiest auguries of our future.

#### NOTES.

THE managers of the Royal Institution have awarded the Actonian prize of one hundred guineas to Madame Curie, as the author of the essay "Recherches sur les Substances Radiactives."

SIR WILLIAM RAMSAY, K.C.B., F.R.S., has been elected an honorary member of the Academy of Sciences of Christiania; and the Società italiana delle Scienze (known as the Society of the Forty) has conferred upon him the Matteucci gold medal for 1907.

THE North Sea Investigation Commissioners will be entertained by the Corporation at the Guildhall on Friday, June 14, the Lord Mayor presiding. The Fishmongers' Company will give a dinner in their honour on the previous evening at Fishmongers' Hall.

THE Government of Chili has appointed Count de Montessus de Ballore, of Abbeville, France, to institute a seismological service of the first rank. This action on the part of the Chilian Government is, says *Science*, a direct result of the disastrous Valparaiso earthquake of last August. The service in question will, at the beginning, include one station of the first rank and three of the second.

PROF. IRA REMSEN, president of the Johns Hopkins University, has been elected president of the National Academy of Sciences, in succession to Mr. Alexander Agassiz. The vacancy thus created in the vice-presidency has been filled by the election of Dr. C. D. Walcott, secretary of the Smithsonian Institution. Sir James Dewar, F.R.S., Prof. A. R. Forsyth, F.R.S., Prof. D. Hilbert (Göttingen), and Prof. J. C. Kapteyn (Gröningen) have been elected foreign associates of the academy.

THE University of Geneva will celebrate with appropriate pomp and circumstance the 350th anniversary of its foundation, which falls in 1909. We learn from the *British Medical Journal* that a committee has been appointed to arrange for the proper solemnisation of the festal rites, to which representatives of foreign universities will be invited. The "Academy," founded by John Calvin in 1559, retained that title until 1798. It was afterwards erected into a university, and reached its full development, with faculties of theology, law, physic, philosophy, and science, in 1873.

REUTER reports that the Observatory of Catania and Etna has issued the following statement:—"The activity of Mount Etna is increasing. The mouth at the base of the central crater is emitting vapour and small incandescent stones. On May 4, at 11.10 a.m., another mouth of smaller dimensions opened and threw up boiling lava. At the observatory the sound of an almost continuous eruption has been heard up to May 6. At Nicolosi a reddish vapour was seen rising from the volcano."

THE professors of the National Museum of Natural History of Paris have decided to open an international subscription with the object of offering a worthy tribute

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to the memory of Lamarck, by erecting his statue in the Jardin des Plantes. Subscriptions may be sent to Prof. Joubin, at the National Museum of Natural History, Paris. The committee has decided to offer to all subscribers of not less than twenty francs a reproduction in heliogravure of an authentic unpublished portrait of Lamarck, which was painted for his family by Thévenin in 1801. To all subscribers of not less than 200 francs a plaster cast of the bust of Lamarck by the sculptor Fagel (to whom is entrusted the execution of the proposed monument) will be presented. The scheme has already received distinguished support, and a comprehensive committee comprising representative men of science of all nationalities has been formed. Among the list of the committee we notice the names of Sir John Evans, K.C.B., Sir Archibald Geikie, Prof. Ray Lankester, and Sir John Murray, K.C.B.

THE New York Academy of Sciences will celebrate on May 23 the 200th anniversary of the birth of Linnaeus. The anniversary celebrations will begin at the American Museum of Natural History with an exhibition of American animals known to Linnaeus. Letters concerning the anniversary received from scientific societies will be read at the beginning of the morning session, and afterwards an address on North American geography in the time of Linnaeus will be delivered by the president of the American Geographical Society. Dr. J. A. Allen has been invited to speak on Linnaeus and American zoology. In the afternoon there will be an exhibition of American plants known to the Swedish naturalist, and an address on Linnaeus and American botany will be given by Dr. Per Axel Rydberg. A bronze tablet in memory of Linnaeus, a gift to New York from the Academy of Sciences, will be unveiled at the bridge—which is to be dedicated to Linnaeus—over the Bronx River in Pelham Parkway, between the Botanical Garden and the Zoological Park. Numerous addresses will be delivered in connection with the unveiling ceremony. In the evening, at the museum, the director of the museum of the Brooklyn Institute will deliver an address on Linnaeus and American natural history. The various meetings will be open to the public.

WE have to acknowledge the receipt of a copy of the first part of a memoir on the caterpillars of French Lepidoptera ("Les Premiers États des Lépidoptères Français"), by Prof. G. Aronnet, of the College of Natural Science at St. Dizier. The memoir is being published in the *Mémoires* of the Society of Letters, Sciences, &c., of St. Dizier, the first part, which deals with the caterpillars of butterflies, being dated 1906. Unfortunately, there are no illustrations.

IN a report on Antarctic birds collected by the *Scotia* Expedition contributed to the *Ibis* for April, Mr. Eagle Clarke has added four species—the Arctic tern, the blue petrel, the short-winged petrel, and Hutton's sooty albatross—to the nine previously recorded from within the Antarctic circle. Petrels and their relatives are attracted, it is suggested, so far south by the extraordinary abundance of food to be found immediately north of the ice-barrier, some of these visitors making their appearance in autumn after the breeding season, while others may be non-breeding birds which spend the whole summer in the South Antarctic. That the Arctic tern, after breeding in the far north, should visit the opposite pole is a most remarkable fact.

IN reference to a suggestion that Fair Island, an outlying member of the Shetland group, is specially favoured by migratory birds, Mr. Eagle Clarke, in a paper pub-

lished in the April number of the *Annals of Scottish Natural History*, points out that we should rather consider the island specially favourable to the observer. Despite the number of trained observers, the writer considers that "we in Britain see only an infinitesimal number of the migrants which visit our shores far fewer than is generally supposed, and this is especially the case on the mainland." In addition to recording, for the first time, the red-rumped swallow as a visitor to the British Isles, Mr. Clarke was fortunate enough to observe a number of rare birds, several of which were previously unknown to visit the Shetlands.

AMONG rare birds recorded in Norfolk by Mr. J. H. Gurney in his ornithological report for 1906, published in the April number of the *Zoologist*, are five glossy ibises, which made their appearance on Breydon Broad on September 3. It is believed that three birds of the same species, killed shortly afterwards in Ireland, together with one shot in Sussex, represented this flock. Immediately following the ibises came a flock of thirteen red-headed pochards, which settled on Breydon, where they were soon destroyed. The movements of these birds were connected, in the author's opinion, with a wave of heat which occurred at the same time. A pelican and a couple of flamingoes were also among the summer arrivals, but the latter appear to have been birds which escaped from Woburn, and there can be little doubt that the former had likewise been in captivity. The occurrence on the coast of an example of a bulbul, *Liothrix lutea*, may apparently be accounted for by the fact that a number of these birds were turned out at Woburn.

THE Journal of the Society of Arts for December 14, 1906, contains a paper read before the council of the National Fruit-growers' Federation by Mr. C. H. Hooper, on fruit-growing and bird-protection. The paper is also in course of publication in the *Gardener's Magazine*, of which the issue for April 20 contains the first instalment. It is satisfactory to see that Mr. Hooper speaks his mind plainly, without any attempt at special pleading for species which are notoriously harmful; and while admitting that birds are, on the whole, beneficial to the agriculturist and horticulturist, advocates the relentless destruction of certain kinds and a restriction of the numbers of others. Another author has already advocated the most stringent measures for the extermination of sparrows, wood-pigeons, and stock-doves as being distinctly injurious, and pleaded in favour of permitting, or rather encouraging, the taking of the eggs of the chaffinch, greenfinch, and bullfinch. Mr. Hooper, in addition to reducing the numbers of the species just named, urges that in fruit-growing districts it may be absolutely essential to kill off a percentage of blackbirds, starlings, and even missel-thrushes, thrushes, and rooks. On the other hand, hawks, owls, and strictly insectivorous birds of all kinds should be religiously protected. A few more straightforward and outspoken addresses of this description, and there would perhaps be less nonsense talked and written about the duty of encouraging and protecting birds even where they are eating the unfortunate gardener and farmer out of house and home.

IN a paper read before the Epidemiological Society, Colonel Bruce, F.R.S., details recent researches into the epidemiology of Malta fever, showing that goats' milk is the principal source of infection. One-third of the cases of Malta fever in the Navy could be traced to residence in the Royal Naval Hospital, Malta, but since the use of

goats' milk has been prohibited not a single case has occurred there.

THE making of models of microscopic objects by means of wax reconstruction plates has taken a recognised place in morphological, embryological, and pathological research. The cutting out of the plates by means of a scalpel, the usual method, has disadvantages, and Mr. Mark has devised an electric wax-cutter in which a platinum wire, electrically heated and mounted in a sewing machine, performs the work expeditiously and efficiently (Proc. Amer. Acad. of Arts and Sciences, xlvi., No. 23, March).

In the *Bio-Chemical Journal* for April (ii., No. 4) Mr. Lovatt Evans discusses the catalytic decomposition of hydrogen peroxide by the catalase of blood. His experiments suggest that the reaction velocity may be explained by the hypothesis known as the "active system" theory, first suggested by Prof. Adrian Brown and subsequently by Prof. Armstrong. Dr. Maclean describes experiments on the influence of kreatinin in modifying certain reactions of sugar in urine, and Dr. Spriggs discusses the excretion of the same substance in pseudo-hypertrophic muscular dystrophy. Messrs. Bearn and Cramer detail observations on zymoids, substances present in enzymes which have the property of combining with the substrate without the power of destroying it, and obtain evidence of their existence in pepsin, rennin, emulsin, and takadiastase. Mr. Coleman describes the effect of certain drugs and toxins on the coagulation of the blood.

A PRELIMINARY list of higher fungi collected by Mr. N. M. Glatfelter in the vicinity of St. Louis during a period of eight years is published as vol. xvi., No. 4, of the *Transactions of the Academy of Science of St. Louis*. Of about five hundred species enumerated, the majority are basidiomycetes. The determinations authenticated by Prof. C. A. Peck include twenty new species.

AN account of an instruction camp organised by Mr. J. A. Leach for members of the Field Naturalists' Club in Victoria appears in their journal, the *Victorian Naturalist* (March). The camp was pitched at Mornington, on the eastern shore of Port Phillip Bay. Each day was devoted to the study of one or other branch of natural history under the direction of special leaders, and lectures were arranged in the evening. The reports of the excursions made each day and the evening lectures are printed in the journal.

THE reports of the director and other Government officials connected with the Royal Botanic Gardens, Ceylon, are published as a consecutive series, beginning with No. 20, in vol. iii. of the *Circulars and Agricultural Journal*. Mr. T. Petch, in his report as Government mycologist, refers to a number of fungi infesting tea bushes; of these, a new species, *Massaria theicola*, producing a stem-disease, is under examination, also the horse-hair blight, generally attributed to *Marasmius sarmentosus*. The most serious outbreak of fungal disease was caused by a *Phytophthora* growing on the fruits of Para rubber trees, inducing decay and rot. The disease spread rapidly during the rains in June, and seemed likely to cut short the supply of seed, but was checked by the dry weather in July. The most dangerous insect pests mentioned by Mr. E. E. Green were the tortrix, *Caepha coffearia*, and shot-hole borer, *Xyleborus formicatus*, both pests of the tea plant; a leaf-rolling caterpillar was fortunately restricted to the Funtumia rubber trees. Mr. Green also alludes to experiments for introducing the eri-silkworm, *Attacus ricini*, and European bees into Ceylon.

THE importance of a closer alliance between science and industry was again strongly emphasised by Sir Alfred Jones at Liverpool on April 8, when, at his invitation, a number of prominent men of science and commerce met at a luncheon given in honour of Mr. Herbert Wright, the author of a valuable work on the rubber industry. Mr. Wright gave a brief account of the progress and methods of rubber cultivation in the British Empire, quoting, as an example of the benefits accruing from the adoption of scientific methods, the enormous advances made by the industry in the Indo-Malayan area during the past decade. Ceylon alone, in a few years' time, may be expected to produce some 5000 to 7000 tons of rubber annually, and our other possessions in the East are developing similarly.

In the Transactions of the Royal Society of Canada (vol. xii., pp. 267-288) Dr. R. W. Ells gives some useful notes on the mineral fuel supply of Canada. He shows that in the western half of the Dominion the supplies of mineral fuel are practically inexhaustible. The analyses of these coals show that their quality is greatly superior to that of those now mined in the Pacific States of the American Union.

THE Transactions of the Institution of Engineers and Shipbuilders in Scotland (vol. I., part vi.) contain a suggestive paper by Mr. R. Royds on the most economical mean effective pressure for steam engines. He appends a bibliography of papers dealing with the steam-engine problem all of which are based upon direct experimental evidence. These should be studied by all concerned with the generation of motive power.

THE demolition of the Great Wheel at Earl's Court, which for twelve years has formed so conspicuous a feature in the London landscape, is now completed. The work, which is described in detail in *Engineering* of April 26, has been one requiring the exercise of much ingenuity in the devising of safe methods of procedure. The wheel was a pin-jointed structure 300 feet in diameter, weighing, with the cars in position, 1000 tons, whilst the two standards on which it was mounted weighed 400 tons more. The whole structure was demolished in less than six months, which, considering that every rivet had to be sawn through, as every nut was completely set in rust, reflects great credit on all concerned.

THE address delivered by the president, Mr. T. Hurry Riches, to the Institution of Mechanical Engineers on April 25 forms a valuable work of reference on rolling stock and the machinery used in railway engineering, its value being enhanced by the seventy-six illustrations accompanying it depicting the locomotives and rolling stock of the railways of Great Britain at the present time. It is evident from these illustrations that modern requirements are gradually bringing the locomotives on the railways more and more into accord with one another when the work to be done is similar.

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An interesting set of models, showing the development of the rack-rail locomotive from Blenkinsop to Abt, has lately been placed on view in the mechanical engineering collection of the Victoria and Albert Museum. The models, which are described in detail in the *Engineer* of April 26, comprise Blenkinsop's original model of the Middleton colliery locomotive of 1812, and models, made at the museum to a scale of 1 to 16, of the Fell centre rail engine of 1867 for the line over the Mont Cenis, of Rigganbach's system of a ladder-rack midway between the running rails (1874), and of Abt's improved form of rack (1882). The three models are admirably adapted for the use of engineering students, and throw much light on a somewhat complex subject.

THE new island in the Bay of Bengal, referred to in Admiral Field's letter in NATURE of February 28, is the



FIG. 1.—General appearance of the new Island in the Bay of Bengal from the eastward, at a distance of about half a mile.

subject of a detailed account, by Lieut. E. J. Headlam, R.I.M., in the April number of the *Geographical Journal*. By the courtesy of the editor we are permitted to reproduce one of the illustrations, which gives a good idea of the

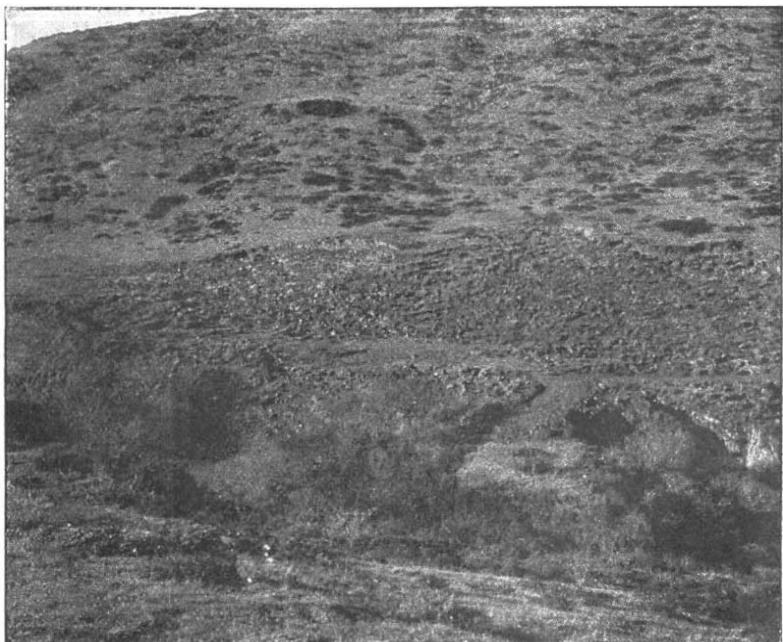


Photo.] [R. S. Holway.  
FIG. 2.—The San Francisco Earthquake: Ploughed land along the earthquake rift.

general appearance of this mud-bank. An illustration to some notes on the San Francisco earthquake, by Jacques W. Redway, in the same number, gives a very good idea of the ploughed land along one of the faults, where this shows at the surface as a belt of shearing instead of as a simple fracture.

In a letter to NATURE of February 14 (p. 368) Mr. Charles G. Barkla described experiments which indicated that nickel must have an atomic weight of about 61.3

instead of the value 58.7 generally accepted by chemists. This result, which is confirmed in a letter just received from Prof. B. Walter, of Hamburg, is based on the law that the secondary Röntgen rays from a chemical element have a specially high penetrative power with regard to the material from which they originate; for other elements this specific penetrative power falls off proportionately as the atomic weight of the element differs from that of the substance producing the rays. Prof. Walter points out, however, that the general properties utilised by Mr. Barkla as a basis for his considerations were in the main published by him in the year 1905 (*Annalen der Physik*, Bd. 17, p. 561; *Fortschritte auf dem Gebiete der Röntgenstrahlen*, Bd. 8, p. 297). Referring to the fact that Mr. Barkla does not accept a specific power of penetration such as Prof. Walter suggested, but holds the opinion which was generally accepted previously, that a selective absorption takes place, Prof. Walter says that this assumption is shown in his papers to lead to contradictions in the case of the primary Röntgen rays. In his opinion, it cannot be correct in the case of the secondary rays, because the phenomena in question become all the more apparent for these rays the thinner the absorbing laminae be made. According to Mr. Barkla's conception, exactly the opposite should be true.

WHILST cuprous chloride and bromide have long been known, the existence of cuprous sulphate has been recognised mainly as a disturbing factor in the copper voltmeter. Owing to the formation of this salt, the copper deposited on the cathode is liable to be partially redissolved  $\text{Cu} + \text{CuSO}_4 \rightleftharpoons \text{Cu}_2\text{SO}_4$ , causing the deposit to be too light; on the other hand, if the cupric solution has been saturated with metallic copper, the deposit is too heavy, since twice as much copper is deposited per coulomb from the cuprous as from the cupric salt. The recent experiments of Foerster and Blankenberg (*Berichte*, xxxix., 4428-4436) have added much to our knowledge of this salt. By enclosing ammonium cupric sulphate with metallic copper in sealed tubes they were able to ensure the formation of a large proportion of cuprous sulphate, and actually succeeded in isolating a double salt of the formula  $\text{Cu}_2\text{SO}_4 \cdot 4\text{NH}_3 \cdot \text{H}_2\text{O}$ . When quite dry, the salt can be kept for some weeks in sealed tubes, but it is immediately decomposed by dilute sulphuric acid, giving rise to metallic copper and cupric sulphate. It is of interest to note that a solution containing initially 0.05 mol.  $\text{CuSO}_4$ , 0.95 mol.  $\text{NH}_3$ , and 0.15 mol.  $(\text{NH}_4)_2\text{SO}_4$ , became quite colourless when saturated with metallic copper, and when electrolysed gave a cathode deposit 55 per cent. greater than that obtained from a cupric solution in series.

A POPULAR article upon the planet Saturn and its system, by Mr. E. V. Heward, appears in the May number of the *Fortnightly Review*.

EXCELLENT work is being done by the Central Technical College Old Students' Association, the official organ of which, the *Centralian*, forms a very creditable addition to periodical engineering literature. In the current issue (vol. iv., No. 11) there are original articles on the construction of a new railway, by Mr. A. C. Cookson, and on electrical test-shop measurements, by Mr. Percy Good.

WE have received from Mr. C. Baker, of High Holborn, London, an advance proof of his new quarterly catalogue of second-hand scientific apparatus. The list contains particulars of more than a thousand separate items, and is worth examination.

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#### OUR ASTRONOMICAL COLUMN.

COMET 1907a (GIACOBINI).—No. 4173 (p. 336, April 27) of the *Astronomische Nachrichten* contains a new set of elements for comet 1907a, computed by Miss Lamson, in which the time of perihelion passage is given as March 17<sup>th</sup>. A daily ephemeris, calculated by Prof. Kreutz and based on these elements, is also given, and extends to May 22. The comet is at present apparently travelling very slowly and nearly due north in the northern limits of Orion, its computed positions for May 9 and May 22 respectively being  $\alpha=6h. 11m.$ ,  $\delta=+14^\circ 7'4$  and  $\alpha=6h. 14m.$ ,  $\delta=+17^\circ 5'8$ . The brightness of this object is now about one-quarter of that at the time of discovery, when it was of the eleventh magnitude.

THE TEMPERATURE OF THE SUN.—An excellent popular description of the apparatus and methods by which MM. Millochau and Féry determined the solar temperature during 1906 is given by the former observer in *La Nature* (No. 1770, p. 338, April 27). As previously recorded in these columns (see NATURE, No. 1932, p. 40, November 8, 1906), the observations were made at Meudon, Chamonix, the Grands Mulets, and the summit of Mont Blanc during July and August 1<sup>st</sup>. The instrument used was the pyrheliometric telescope devised by M. Féry in 1902, and described and illustrated in the paper under notice. Essentially it consists of a reflecting telescope, having a mirror of 103 mm. diameter and 80 cm. focal length, in the focus of which is placed a thermoelectric couple, which is connected with a galvanometer reading directly to about one-hundredth of a millivolt. The couple is composed of two wires, one of iron, the other of constantan, soldered together at their point of intersection, the joint being covered with a carefully blackened, very small and very light disc. A bent eye-piece, placed behind the reticle bearing the couple, enables the observer to direct the telescope to any desired portion of the solar disc. The results obtained gave a temperature of  $5663^\circ$ , absolute, for the centre of the solar disc, considering the sun as an ideal black body, or, as M. Guillaume terms it, an "integral radiator." Correcting this value for the probable absorption in the solar atmosphere, M. Millochau obtains  $6130^\circ$  absolute as the effective temperature of the sun's interior.

PHOTOGRAPHY OF THE INFRA-RED SOLAR SPECTRUM.—In No. 14 (p. 725, April 8) of the *Comptes rendus* M. Millochau records some results he has obtained in the photography of the infra-red region of the solar spectrum. The plates employed were specially prepared by plunging them for about ten minutes into distilled water to which several drops of acetic acid had been added, then into a saturated alcoholic solution of malachite green, and finally washing and drying them. They were then rendered much more sensitive by exposing them for 30 seconds at a distance of 75 cm. to a 4 candle-power electric lamp, according to the method suggested by Major-General Waterhouse in 1875.

With plates thus prepared the solar spectrum was photographed, in the region  $0.750 \mu$  to  $0.950 \mu$ , on such a scale that one Angström unit = 0.1 mm., the photographs showing that the structure of the A band in the solar spectrum is identical with that of the B band. Another photograph showed the Z band resolved into lines.

A plane-grating spectrograph of 3 cm. aperture and 60 cm. focal length was employed, and with this apparatus the A band, under good conditions, could be photographed in ten, and the extreme region in thirty, minutes.

THE ORBIT OF  $\alpha$  DRACONIS.—The following elements have been found for the orbit of  $\alpha$  Draconis from spectrograms secured at the Dominion Observatory, Ottawa, by Mr. J. S. Plaskett:—period = 51.42 days,  $\epsilon = 0.322$ ,  $\omega = 20^\circ 3'$ ,  $m_0 = 294^\circ$ ,  $T = 1906$  July 11d. 4h., velocity of system =  $-18.4$  km. per sec.

In No. 2, vol. i. (March-April) of the Journal of the R.A.S. Canada, where the above is published, Mr. Plaskett also gives a very interesting description of the methods employed in adapting a Brashear universal spectroscope to the requirements of line-of-sight spectrography.